AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): An optical amplifier comprising:

an optical waveguide structure through which a̲ signal light w̲a̲v̲e̲ and pump light w̲a̲v̲e̲ are propagated, said optical waveguide structure having a core with a relatively high refractive index and a clad with a relatively low refractive index, at least said core exhibiting a nonlinear response of second or third order, to thereby achieve optical parametric amplification of said signal light w̲a̲v̲e̲; and

separate idler light filter means (5) for attenuating a̲n̲ idler l̶i̶g̶h̶t̶,̶ l̲i̲g̲h̲t̲ ̲w̲a̲v̲e̲ which is generated in the process of optical parametric amplification, said idler light filter means being placed in said optical waveguide structure at a d̶e̶f̶i̶n̶e̶d̶ length L_{max} d̲e̲f̲i̲n̲e̲d̲ ̲b̲y̲ ̲t̲h̲e̲ ̲d̲i̲f̲f̲e̲r̲e̲n̲c̲e̲ b̲e̲t̲w̲e̲e̲n̲ ̲p̲o̲w̲e̲r̲ ̲o̲f̲ ̲t̲h̲e̲ ̲p̲u̲m̲p̲ ̲w̲a̲v̲e̲ ̲a̲n̲d̲ ̲p̲o̲w̲e̲r̲ ̲o̲f̲ ̲t̲h̲e̲ ̲s̲i̲g̲n̲a̲l̲ ̲w̲a̲v̲e̲,̲ ̲t̲h̲e̲ ̲g̲a̲i̲n̲ ̲f̲a̲c̲t̲o̲r̲ ̲o̲f̲ ̲t̲h̲e̲ w̲a̲v̲e̲g̲u̲i̲d̲e̲,̲ ̲a̲n̲d̲ ̲t̲h̲e̲ ̲a̲b̲s̲o̲r̲p̲t̲i̲o̲n̲ ̲o̲f̲ ̲t̲h̲e̲ ̲w̲a̲v̲e̲g̲u̲i̲d̲e̲

2. (canceled).

3. (currently amended): O̶p̶t̶i̶c̶a̶l̶ ̶a̶m̶p̶l̶i̶f̶i̶e̶r̶ ̶a̶c̶c̶o̶r̶d̶i̶n̶g̶ ̶t̶o̶ ̶c̶l̶a̶i̶m̶ ̶1̶ A̲n̲ ̲o̲p̲t̲i̲c̲a̲l̲ ̲a̲m̲p̲l̲i̲f̲i̲e̲r̲ c̲o̲m̲p̲r̲i̲s̲i̲n̲g̲:̲

a̲n̲ ̲o̲p̲t̲i̲c̲a̲l̲ ̲w̲a̲v̲e̲g̲u̲i̲d̲e̲ ̲s̲t̲r̲u̲c̲t̲u̲r̲e̲ t̲h̲r̲o̲u̲g̲h̲ ̲w̲h̲i̲c̲h̲ ̲a̲ ̲s̲i̲g̲n̲a̲l̲ ̲l̲i̲g̲h̲t̲ ̲w̲a̲v̲e̲ ̲a̲n̲d̲ ̲p̲u̲m̲p̲ ̲l̲i̲g̲h̲t̲ ̲w̲a̲v̲e̲ a̲r̲e̲ ̲p̲r̲o̲p̲a̲g̲a̲t̲e̲d̲,̲ ̲s̲a̲i̲d̲ ̲o̲p̲t̲i̲c̲a̲l̲ ̲w̲a̲v̲e̲g̲u̲i̲d̲e̲ ̲s̲t̲r̲u̲c̲t̲u̲r̲e̲ h̲a̲v̲i̲n̲g̲ ̲a̲ ̲c̲o̲r̲e̲ ̲w̲i̲t̲h̲ ̲a̲ ̲r̲e̲l̲a̲t̲i̲v̲e̲l̲y̲ ̲h̲i̲g̲h̲ ̲r̲e̲f̲r̲a̲c̲t̲i̲v̲e̲

index and a clad with a relatively low refractive index, at least said core exhibiting a nonlinear response of second or third order, to thereby achieve optical parametric amplification of said signal light wave; and

separate idler light filter means (5) for attenuating an idler light wave which is generated in the process of optical parametric amplification, said idler light filter means being placed in said optical waveguide structure at a defined length L_{max},

where the length L_{max} is

$$L_{eff\,max} = \frac{P_{po}(dB) - P_{so}(dB) + 3}{\frac{10}{\ln(10)}2g - \alpha(dB/km)}, \text{ and where}$$

P_{po} is pump power, (dB) in logarithmic ~~units~~units,

P_{so} is signal power,

$g^2 = (\gamma\,P_{po}(W))^2 - (\kappa/2)^2$ is the gain ~~coefficient~~coefficient,

γ is the waveguide nonlinear ~~coefficient~~coefficient,

κ is the phase matching ~~term~~term, and

α is waveguide attenuation

4. (currently amended): ~~Optical~~The optical amplifier according to claim ~~1 where~~1, wherein the filter ~~reduced~~reduces at least 50% of the power of the idler wave.